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EST 2157

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S E R I E S

SKILL LEVEL 4

30th Anniversary Apollo 11 Saturn V

FLYING MODEL ROCKET KIT

On May 25th, 1961 President John F. Kennedy issued a challenge to Congress that he felt would "... hold the key to our future on Earth." The call to put a man on the moon was sounded, and the answer still resounds throughout the world today. It is hard to imagine the incredible effort it took to make "... one small step for man, one giant leap for mankind." At the time the decision was made to undertake a manned lunar landing, nothing even close to a rocket with the necessary capabilities existed. After an intensive evaluation and development process, the Saturn V was ultimately chosen as the best course of action.

On July 16th, 1969 the Saturn V launched Apollo 11 into space and history. It is truly mind boggling to attempt to conceive the influences still apparent in everyday life thanks to that mission, and even harder to believe that it was 30 years ago. Here at Estes Industries we have decided to take a look back in order to imagine the future. The Saturn V has remained a much sought after kit throughout the years. We believe this is because the Saturn V ignites the imagination. Having accomplished putting a man on the moon reminds us all that the possibilities are endless. Enjoy building your 30th Anniversary Apollo 11 Saturn V, and all the dreams it may inspire.

MATERIALS REQUIRED:

#320 & #400 SANDPAPER, PENCIL, TWEEZERS, HOBBY KNIFE (SEVERAL SHARP BLADES), YELLOW GLUE, TUBE-TYPE PLASTIC CEMENT, LIQUID PLASTIC CEMENT, PERMANENT SPRAY ADHESIVE (NOT ARTIST'S OR REPOSITIONABLE), CA, and CA for PLASTICS, CA ACCELERATOR, CA ACCELERATOR FOR PLASTICS, SANDING SEALER OR SANDABLE AUTO PRIMER, SQUADRON GREEN OR WHITE PUTTY, MASKING TAPE, SMALL PAINT BRUSH, FLAT BLACK ENAMEL BOTTLE PAINT AND SPRAY PAINT, FLAT WHITE ENAMEL BOTTLE PAINT AND SPRAY PAINT, ENAMEL SILVER SPRAY PAINT (OPTION: YOU MAY ALSO WANT BOTTLE SILVER), OR ENAMEL GUNMETAL SPRAY PAINT INSTEAD OF SILVER, "DULLCOTE" SPRAY PAINT (BE SURE TO FOLLOW INSTRUCTIONS AND CAUTIONS), DO NOT USE LACQUER BASED PAINTS! THEY CAN "CRAZE" THE SURFACE OF THE PLASTIC PARTS. 1/4" (6 mm) LAUNCH ROD (WE RECOMMEND THAT YOU USE THE NORTH COAST ROCKETRY® MODULAR™ LAUNCH PAD AND ROD.)

Please be extremely careful using cyanoacrylate adhesive (CA). Avoid getting in your eyes or on your skin. Safety glasses are recommended. Use adhesives and paint only in areas with adequate ventilation.

Be sure to read all instructions, test fit all parts, and sand if necessary before gluing.

Note: Before beginning to build with vac-formed plastic parts, read the following sections carefully.

Cutting Vac-Formed Parts

Cutting vac-formed plastic parts requires patience. Applying light pressure, make repeated passes with the blade to cut through the plastic. Be sure to keep the blade in the same cut line each time; too much pressure will cause the blade to move and not cut cleanly.

Sanding and Trimming Vac-Formed Parts

Once the part is free of excess plastic, sand the edges to remove any flash and to provide a smooth, flat bonding surface. Secure a sheet of #220 or #320 grit sandpaper to a flat surface. (You may want to use wet-or-dry sandpaper with a little water to avoid clogging or loading the sandpaper with plastic dust.) Move each part in a circle against the sandpaper with pressure evenly distributed to avoid uneven sanding. Applying too much pressure can cause uneven edges. When working with thin edges, be careful not to remove too much plastic or generate too much heat that may warp and destroy the part. NOTE: Double sided tape may be used to hold small parts. Use a file to remove excess plastic on hard to hold small parts.

Adhesives for Vac-Formed Parts

Because vac-formed parts are thinner than injection molded parts, different adhesives should be used. Two basic types give good results and you should have both on hand when building this model.

First is liquid plastic cement. Our preferred brands are Plastic Weld Cement (Plastruct), Testor's Plastic Cement #3502, Microweld (Kassel Industries), Tenax TR-7, and Testor's or Tamiya glue pens. Liquid cements work on styrene by dissolving the plastic and creating a chemically welded bond. As a result, a little bit goes a long way! Liquid cements are usually applied with an artists brush. The trick to using plastic cement is to take advantage of the liquid flowing out from the brush by allowing cement to bleed into close fitting parts and then squeezing the parts together to bond. Work on a small area at one time as plastic cement sets quickly.

The second adhesive to have on hand is a super glue or cyanoacrylate for plastics. We recommend Pic Plasti-Stic or Plasti-Zap. You'll also want to use CA accelerators for plastics for these, but use a toothpick or a pipette to apply accelerator one drop at a time. When sprayed from their normal applicators, most regular CA accelerators will soften and stain plastic surfaces.

Filling the Seams

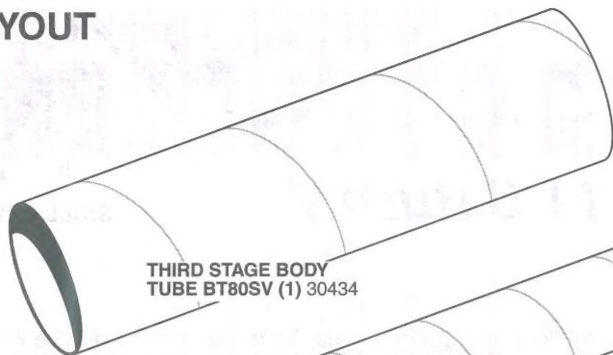
This is a necessary step in constructing vac-formed models. Because these models have seams, they need to be filled and smoothed. The putties we recommend are 3M Accyl-Blue (Usually found at auto body supply shops - one tube will last a long time!) and Squadron Green or White Putty (usually found in hobby shops.)

When working with putty or filler use as little as possible. Excess putty in a seam creates extra work in sanding it away, as well as the possibility of a "sinkhole" (where the putty collapses the skin of the plastic and eats it away.) Use masking tape along seams to minimize excess putty from adhering to the work area. Use multiple layers when building up low areas, rather than one thick layer of putty. Doing so will reduce shrinkage, cracking, and the risk of sinkholes. Let the putty dry overnight before attempting to sand it away. Wet-or-dry sandpaper, used wet, works best. Start with #220 grit and work your way through #320 to #400. Then polish the area with #600.

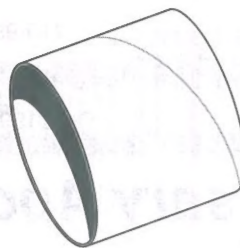
PARTS LAYOUT



THIRD STAGE
COUPLER 80C (1)
30274



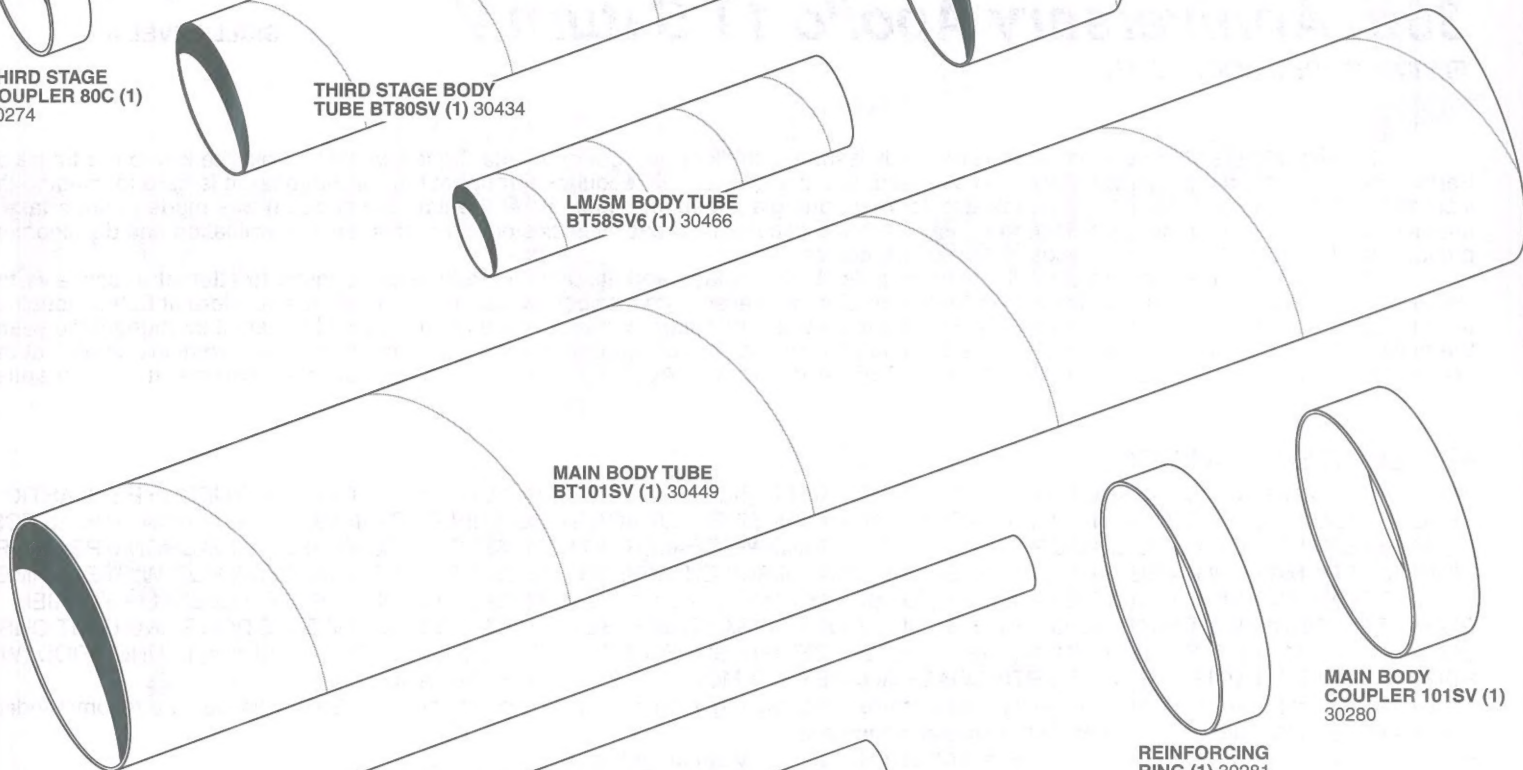
THIRD STAGE BODY
TUBE BT80SV (1) 30434



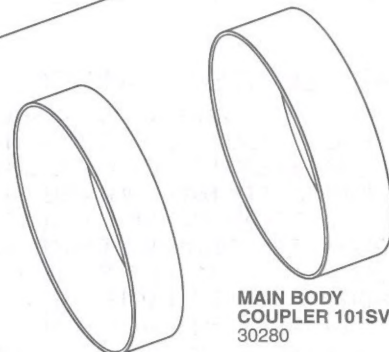
SPACER RING 90SV
[DISPLAY COUPLER]
(1) 30460



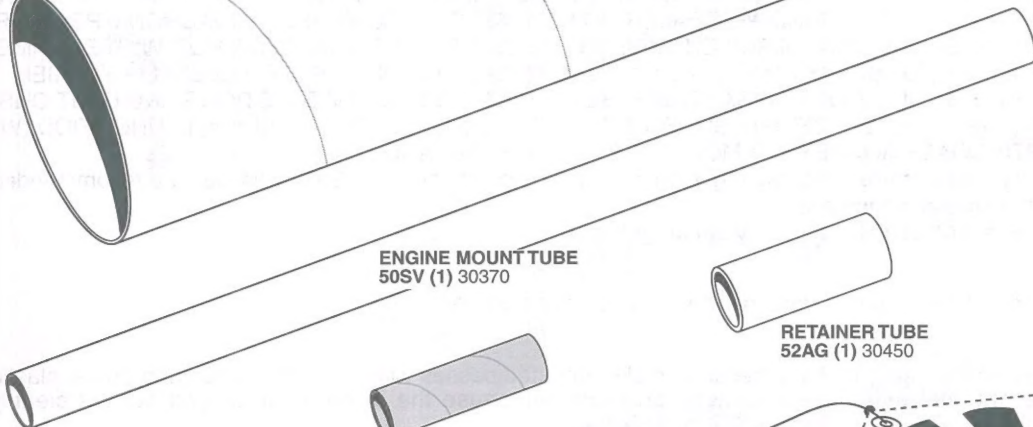
LM/SM BODY TUBE
BT58SV6 (1) 30466



MAIN BODY TUBE
BT101SV (1) 30449



MAIN BODY
COUPLER 101SV (1)
30280



ENGINE MOUNT TUBE
50SV (1) 30370



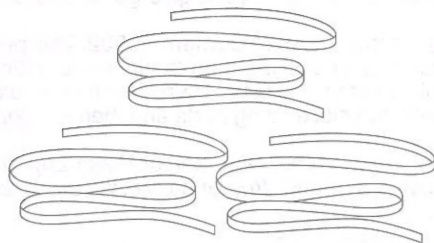
RETAINER TUBE
52AG (1) 30450



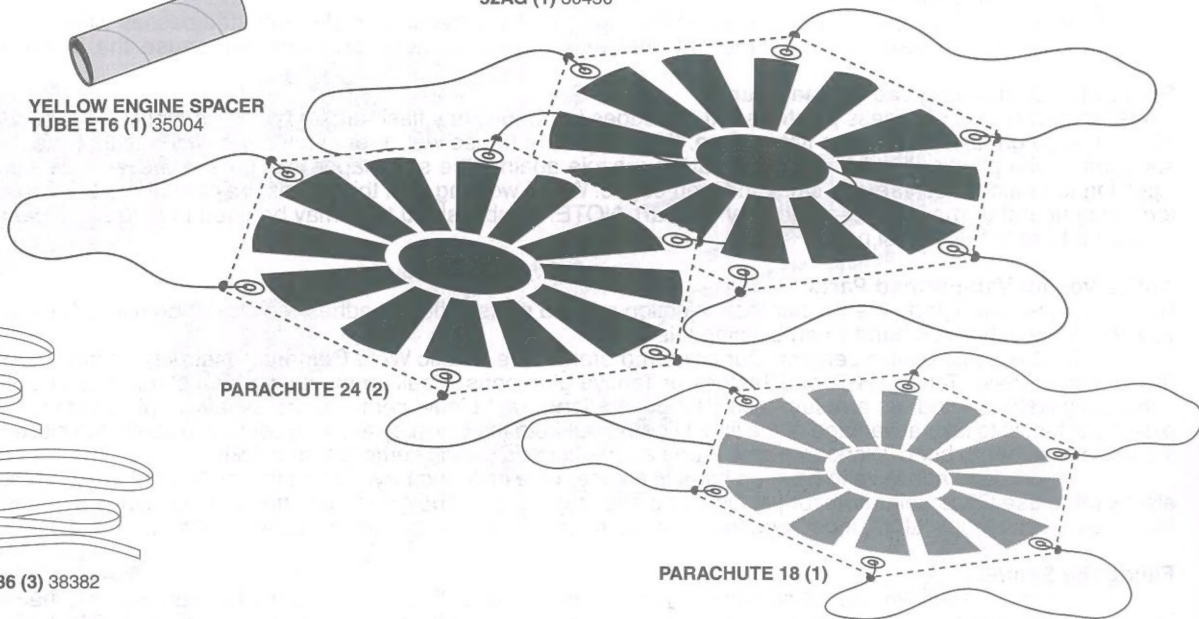
YELLOW ENGINE SPACER
TUBE ET6 (1) 35004



THRUST RING
2050 (1) 30164-2



SHOCK CORD 1/4 x 36 (3) 38382

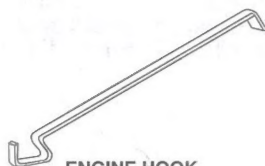


PARACHUTE 24 (2)

PARACHUTE 18 (1)



BRASS WIRE (1)
38331



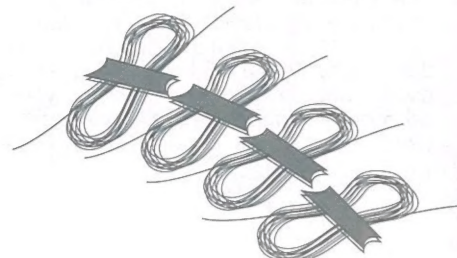
ENGINE HOOK
EH-2A (1) 35021



SNAP SWIVEL (1) 38265

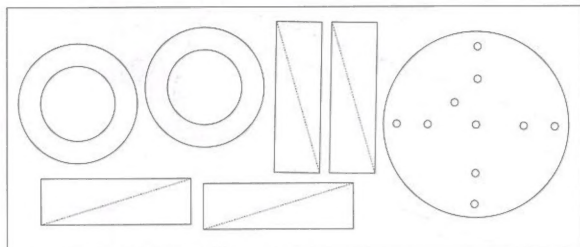


LAUNCH LUGS
HLL2754 (2) 38181

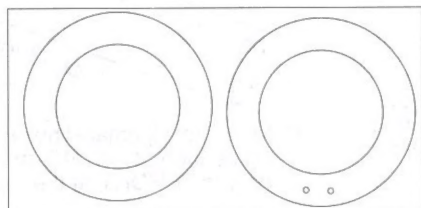


SHROUD LINE (4 BUNDLES) 38241

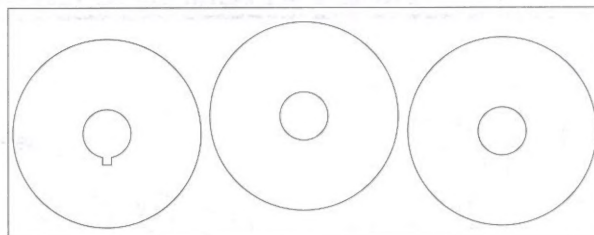
DIE CUT CARDS



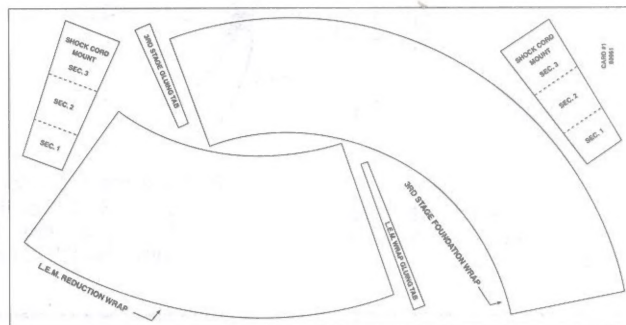
#32472 (NOZZLE BULKHEAD, LEM/SM CENTERING RINGS, FAIRING GUSSETS)



#32471 THIRD STAGE CENTERING RINGS)

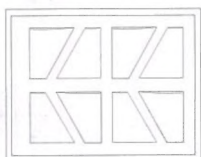


#32473 (ENGINE MOUNT CENTERING RINGS)

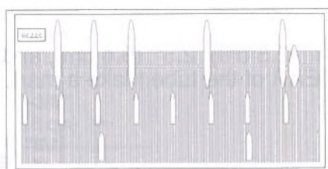


#83591 PRINTED CARD (SHOCK CORD MOUNTS, 3RD STAGE FOUNDATION WRAP, L.E.M. REDUCTION WRAP)

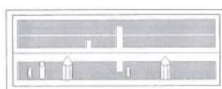
VACUUM FORMED PARTS



32851 FIN SHEET



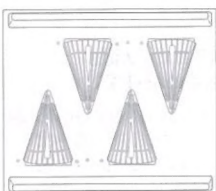
32855 INTER STAGE WRAP



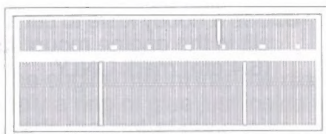
32856 UPPER 3RD STAGE WRAP/
LOWER 3RD STAGE WRAP



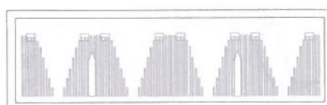
32857 BODY WRAP REDUCTION



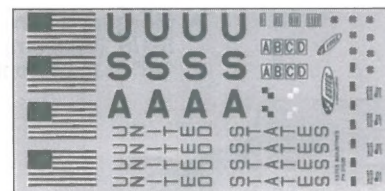
32852 FAIRING SHEET



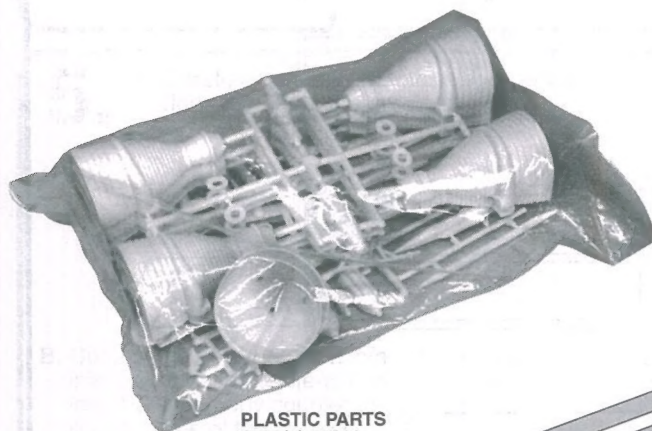
32854 INTER TANK WRAP/
UPPER 2ND STAGE WRAP



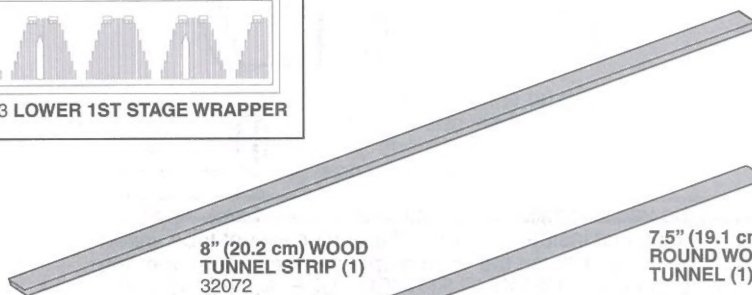
32853 LOWER 1ST STAGE WRAPPER



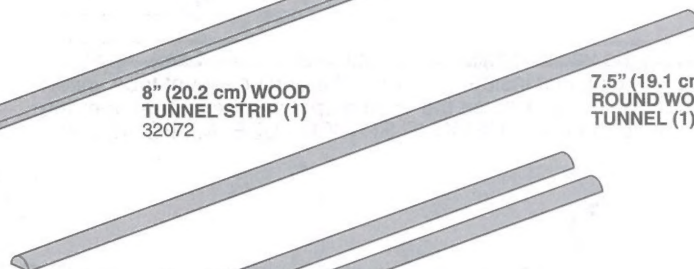
DECAL SHEET (1) 37038



PLASTIC PARTS
SET (1) 33100



8" (20.2 cm) WOOD
TUNNEL STRIP (1)
32072

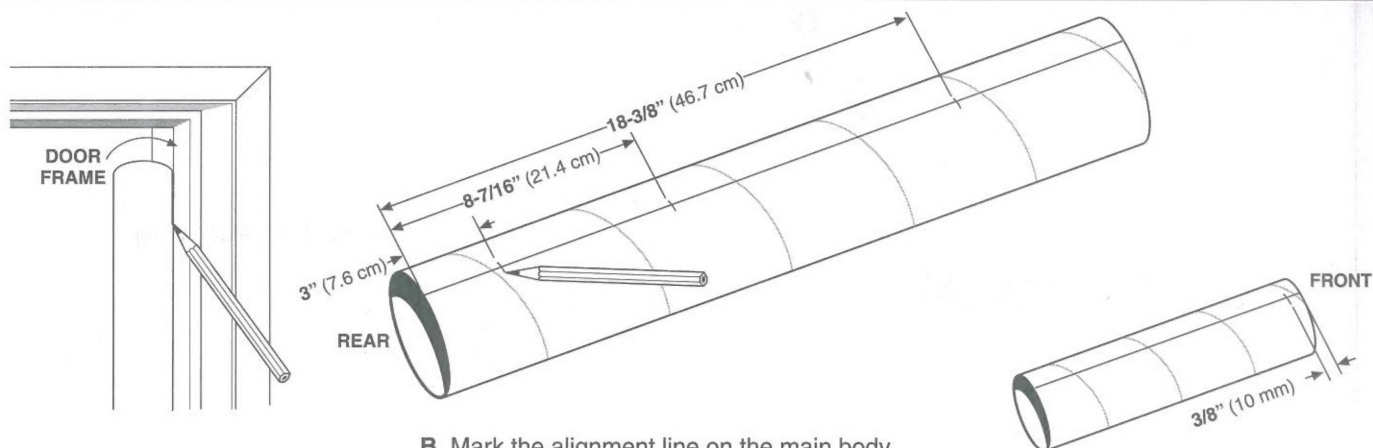


7.5" (19.1 cm) HALF
ROUND WOOD
TUNNEL (1) 32071

14" (35.6 cm) HALF
ROUND WOOD
TUNNELS (2) 32070

NOTE: Due to the unique nature of this kit, which combines the best of both the original Estes and Centuri parts, there will be extra parts left over when you are finished. Do not be concerned.

1.

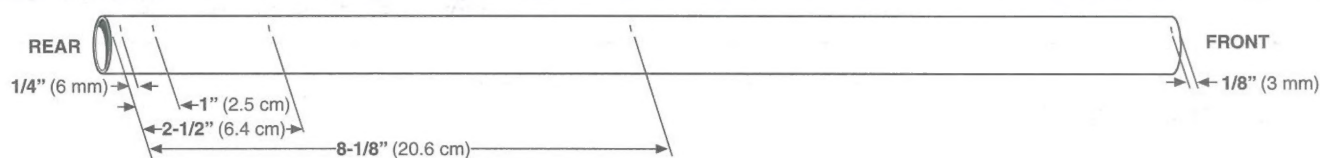


A. Use a door frame as a guide to draw a straight line down the main and third stage body tubes.

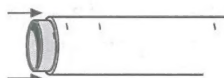
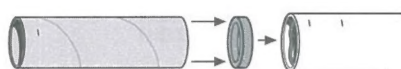
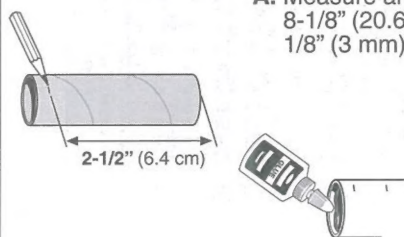
B. Mark the alignment line on the main body tube at 3" (7.6 cm), 8-7/16" (21.4 cm), and at 18-3/8" (46.7 cm). The end you measure from is now the REAR of the tube.

C. Mark the alignment line on the third stage tube at 3/8" (10 mm). This is now the FRONT of the tube.

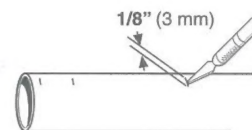
2.



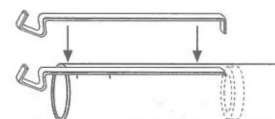
A. Measure and mark the engine mount tube at 1/4" (6 mm), 1" (2.5 cm), 2-1/2" (6.4 cm), and at 8-1/8" (20.6 cm). The end you measured from is now the REAR of the tube. Make a mark at 1/8" (3 mm) from the front of the tube.



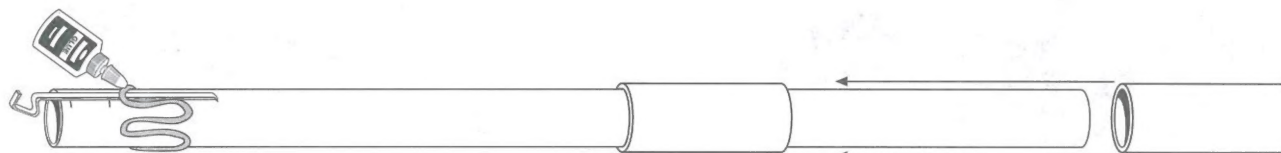
B. Mark the yellow engine spacer tube at 2.5" (6.4 cm). Apply a ring of glue just inside the rear of the engine mount tube, insert the thrust ring and use the engine spacer tube to push the ring in up to the mark. REMOVE SPACER TUBE IMMEDIATELY!



C. Use a hobby knife to cut a 1/8" (3 mm) wide slit in the engine mount tube at the 2-1/2" (6.4 cm) mark ONLY.

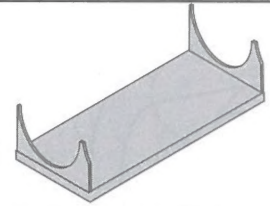
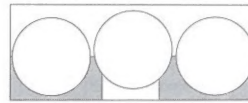
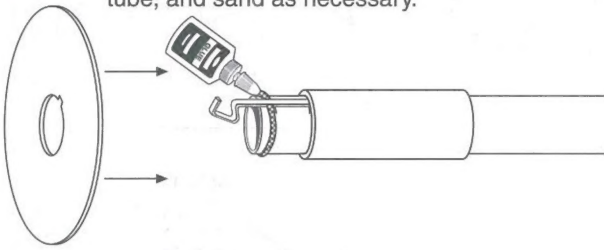


D. Insert the engine hook as shown.

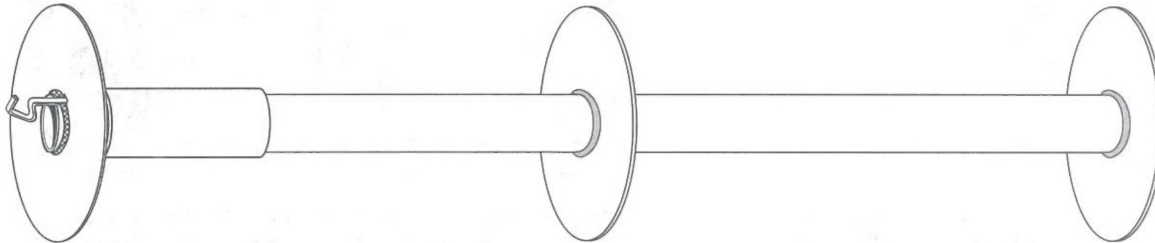


E. Slide the retainer tube part way down the engine mount tube, apply a band of white glue just above the 1" (2.5 cm) mark, and slide the retainer tube down to mark. Before glue dries, check that the engine hook is straight.

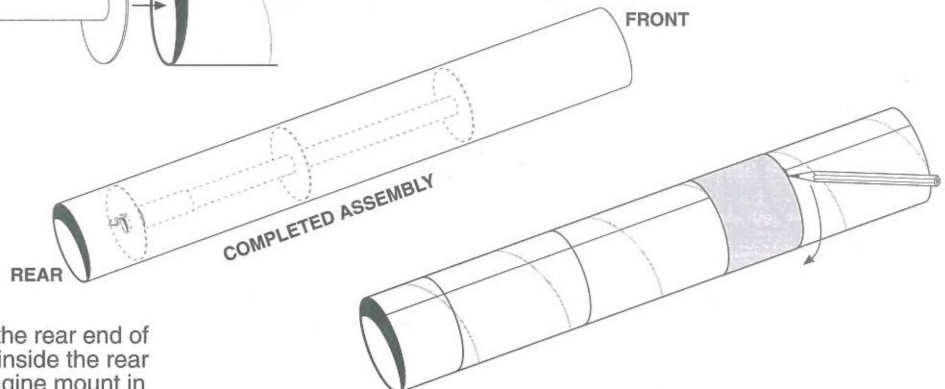
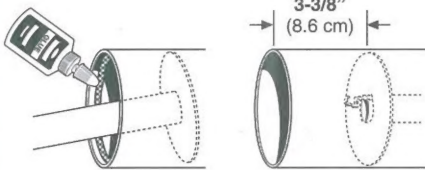
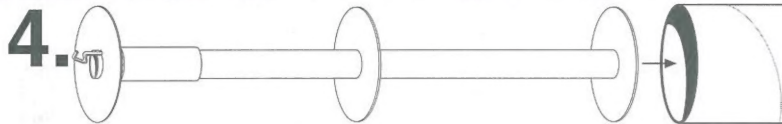
- 3.** A. Use a hobby knife to carefully remove the centering rings from their die-cut card, test fit onto engine mount tube, and sand as necessary.



OPTIONAL STEP: A cradle for holding the body assembly is very handy. To make a cradle, use a piece of wood about 4" wide x 15" long (10 cm wide x 38 cm long). Cut two pieces from the die cut card as shown and glue to the wood as shown to complete cradle.



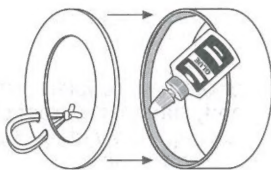
- B. Apply a band of yellow glue around the engine mount tube just behind the 1/4" (6 mm) mark (do not get glue on engine hook). Then slide the notched ring over the engine hook and position at the 1/4" (6 mm) mark. Check that the ring is perfectly perpendicular to the tube all the way around and the notch is over the engine hook. Glue the remaining centering rings at the 8-1/8" (20.6 cm) mark and at 1/8" (3 mm) from the front of the tube, making sure the rings are straight. Let dry, then fillet all of the ring/tube joints.



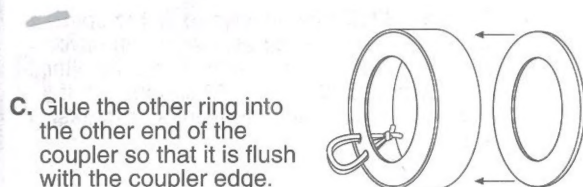
- A. Slide the front ring on the engine mount into the rear end of the main body tube, apply a ring of glue just inside the rear of the body tube, then slide the rest of the engine mount in until the rear ring is 3-3/8" (8.6 cm) from the rear end of the body tube. Apply a bead of glue to the ring/tube joints at each end, let dry, then fillet the joints.

- B. Carefully extend the marks you made on the main body tube alignment line all the way around the tube, making sure the rings you draw are straight. (You may want to use a thick piece of paper or masking tape as an aid in drawing the rings.)

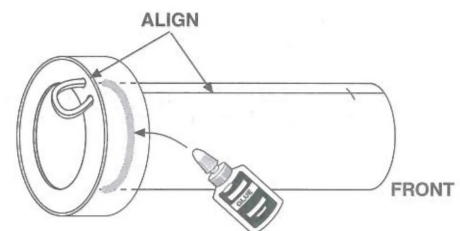
- 5.** A. Carefully remove the third stage centering rings from their die-cut card.



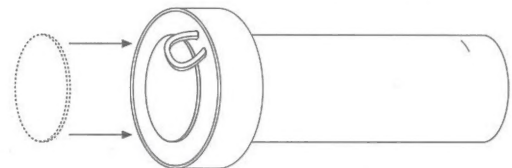
- B. Cut a piece of line 5" (12.7 cm) long, double it, and thread the ends into the holes in the die-cut ring as shown. Test fit and glue the ring into the main body coupler (3-15/16" [10 cm] long) so that the knot is on the inside of the coupler and the ring is flush with the coupler edge.



- C. Glue the other ring into the other end of the coupler so that it is flush with the coupler edge.

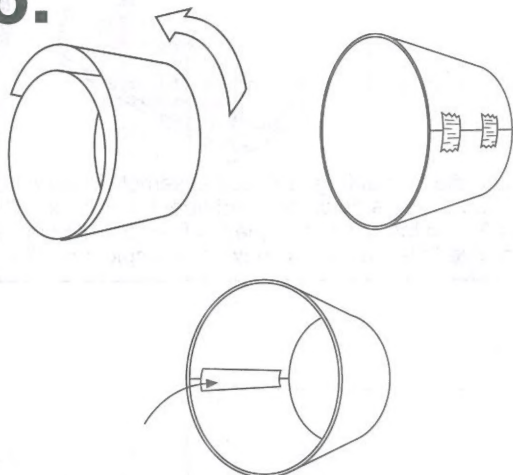


- D. Align the reference line you drew earlier on the third stage body tube with the string loop, and glue the tube into the coupler assembly. (Be sure to note the front of the tube.) Let dry.

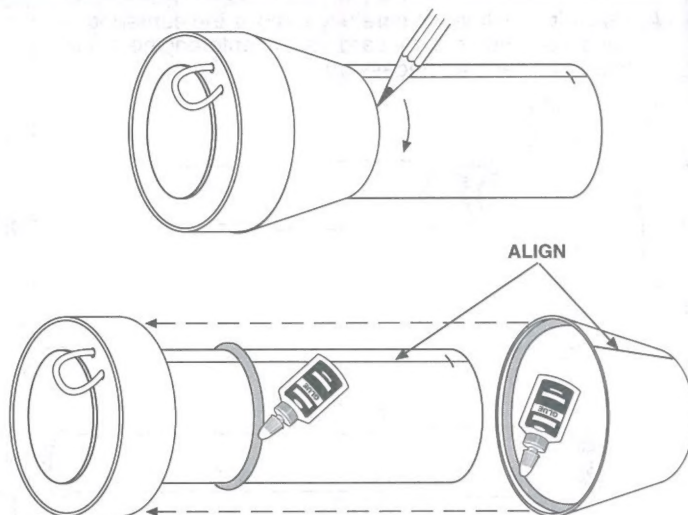


- E. Glue the center from one of the die-cut rings onto the bottom of the tube/coupler assembly.

6.



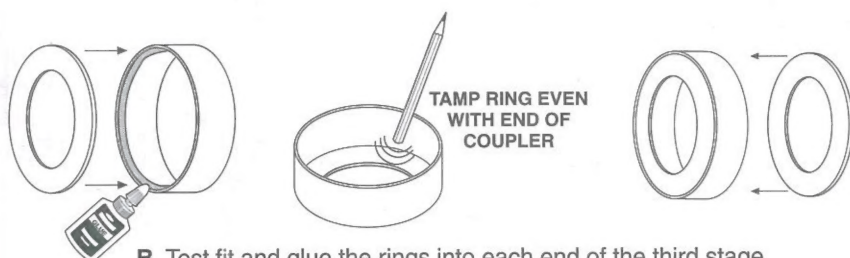
A. Carefully cut along the outside edges of the third stage foundation wrap and glue tab. Curl the wrap, use low tack masking tape to tape the ends together, and glue the tab to the inside seam leaving about 1/16" (2 mm) of clearance at both the top and bottom as shown. Let dry.



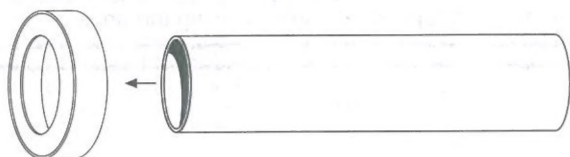
B. Slide the wrap onto the coupler, draw a line around the body tube at the front of the wrap, and remove. Apply a ring of glue around the tube at the mark, and slide the wrap back into place making sure to align the seam in the wrap with the alignment line on the tube.

7.

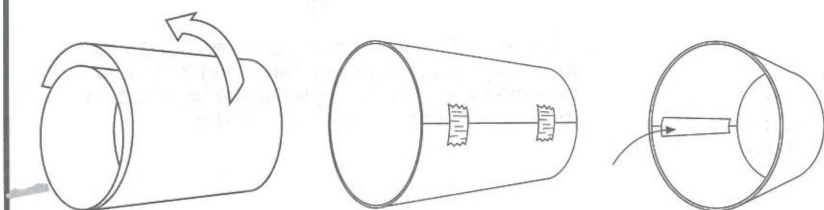
A. Carefully remove the LM/SM centering rings from their die-cut card.



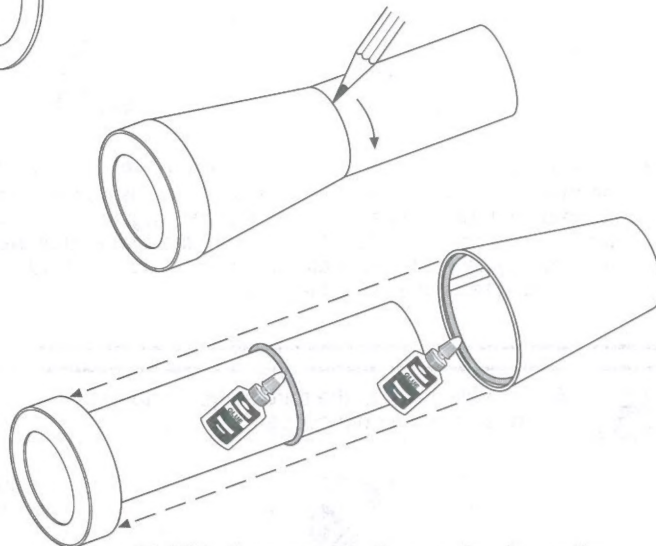
B. Test fit and glue the rings into each end of the third stage coupler so that the ring/coupler edges are flush.



C. Glue the LM/SM body tube into the coupler ring assembly and let dry.



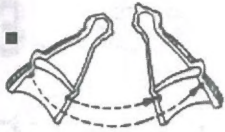
D. Carefully cut along the L.E.M. reduction wrap, roll, tape, and glue the tab to the inside seam leaving about 1/16" (2mm) clearance at both the top and bottom, let dry.



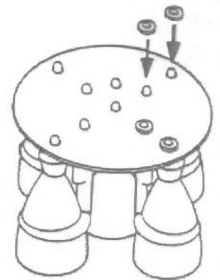
E. Slide the wrap onto the coupler, draw a line around the body tube at the front of the wrap, remove wrap, apply glue where shown, and reapply wrap.

OPTIONAL STEP: If you wish to fill the spiral seams on the body tubes, use automotive primer or putty to do so now. Sand the filler down using #220 then #320 sandpaper. If you obscure any alignment lines or marks, reapply them now.

8.



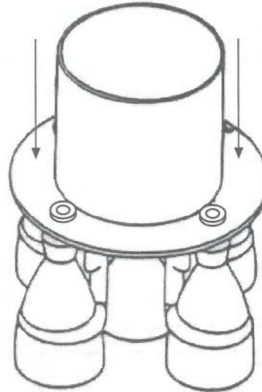
B. Paint the nozzle assemblies gun metal gray or silver and let dry overnight.



A. Use a hobby knife to remove and trim the nozzle halves and supply tubes from the plastic sprue. Use liquid plastic cement or plastic CA to glue the nozzle halves together, and then to attach the supply tubes. Be sure to note that the middle (heavy) portion of the tubes point down toward the nozzles. Hold tubes in place until cement sets, check that tube is straight, and let dry.

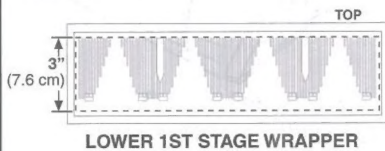
C. Use a hobby knife to remove the bulkhead from its die-cut card. Position the bulkhead over the nozzles. Place the plastic washers over the nozzle nubs on bulkhead. Use the spacer ring to press the bulkhead down onto nozzles and to ensure that the nozzles all sit evenly on a flat surface. You will notice that the spacing between the spacer ring and the washers is tight. Position the washers so that they do not interfere with the fit of the spacer ring to the bulkhead.

D. Use liquid plastic cement or plastic CA to glue the washers in place and let dry.

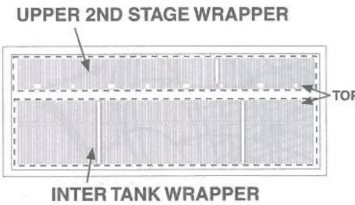


E. Remove the spacer ring, apply white or yellow glue and reposition on bulkhead.

9.

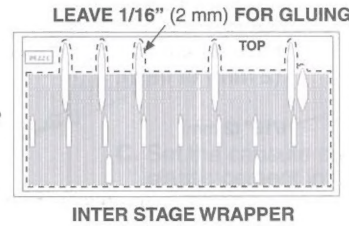


LOWER 1ST STAGE WRAPPER

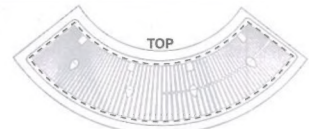


UPPER 2ND STAGE WRAPPER

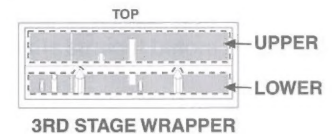
INTER TANK WRAPPER



INTER STAGE WRAPPER

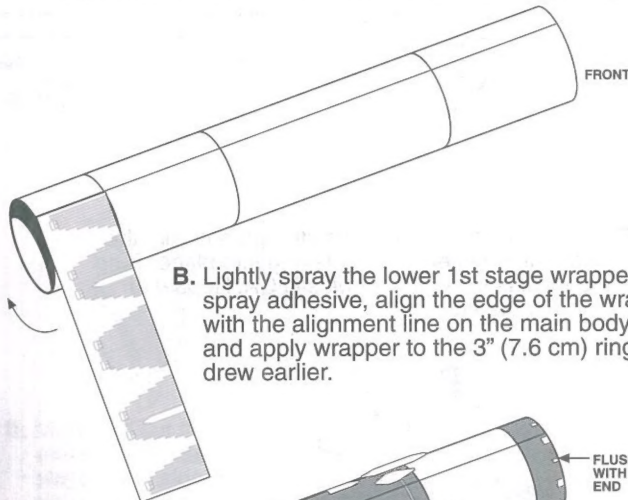


REDUCTION BODY WRAP

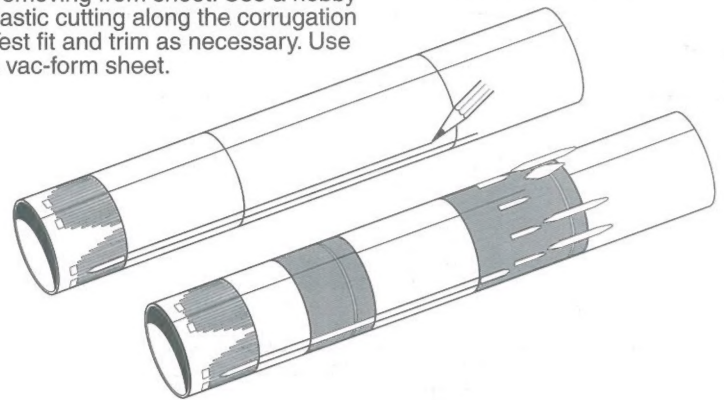


3RD STAGE WRAPPER

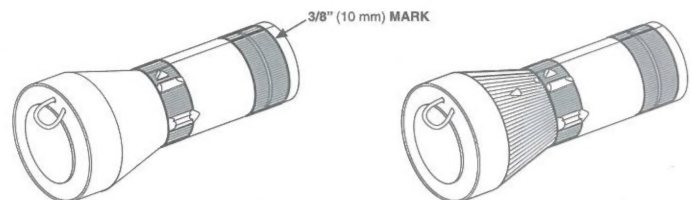
A. Orient wraps according to the diagram and lightly mark the top of each wrap for later reference. Be sure to note and mark the top of the inter tank wrap before removing from sheet. Use a hobby knife to carefully remove the vac-form wraps from the excess plastic cutting along the corrugation on the left side and leaving some excess plastic on the right. Test fit and trim as necessary. Use the dimensions shown to cut the lower 1st stage wrap from the vac-form sheet.



B. Lightly spray the lower 1st stage wrapper with spray adhesive, align the edge of the wrapper with the alignment line on the main body tube, and apply wrapper to the 3" (7.6 cm) ring you drew earlier.



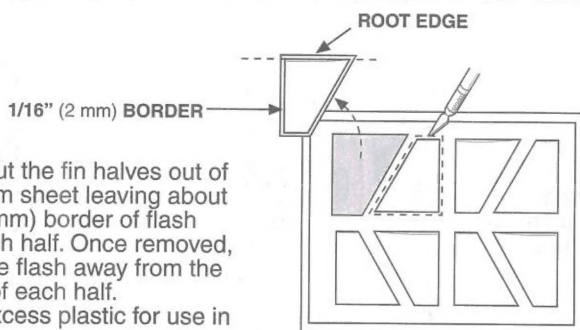
C. Once dry, extend alignment lines along each side of the two tunnels on the vac-form wrap for 11" (27.9 cm). Use these lines as guides and affix the inter tank and inter stage wraps. (Be sure your tunnel locations line up).



D. Once the inter stage wrap is dry, extend 6" (15.2 cm) alignment lines from the sides of the forward tunnel to use as guides and apply the upper second stage wrap.

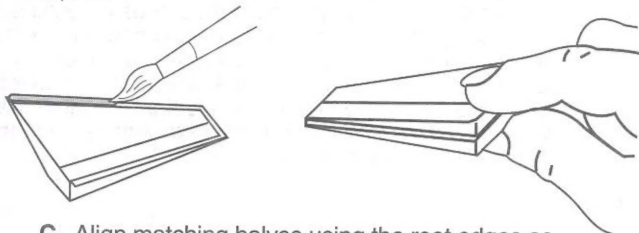
E. Apply the upper third stage wrapper to the the third stage body tube at the 3/8" (10 mm) mark, and the lower third stage wrapper and reduction wrapper where shown on the third stage assembly. Be sure tunnel locations line up.

10.

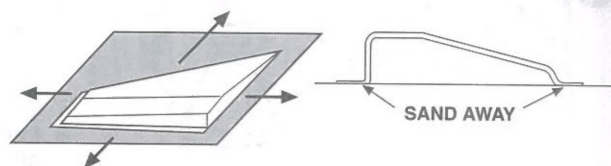


- A. Carefully cut the fin halves out of the vac-form sheet leaving about a 1/16" (2 mm) border of flash around each half. Once removed, cut all of the flash away from the root edge of each half.

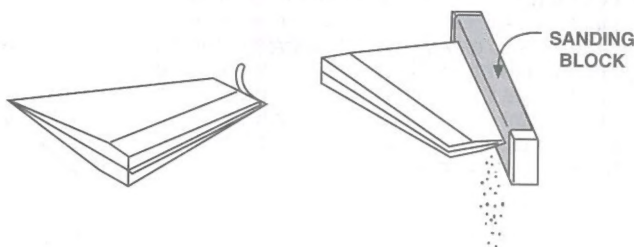
Note: Save excess plastic for use in step 15.



- C. Align matching halves using the root edges as guides, then use liquid plastic cement to secure. Let dry.

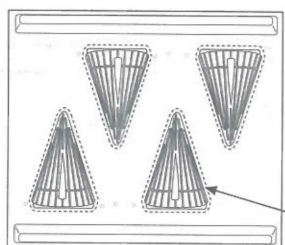


- B. Sand the back sides of the halves until the plastic flanges are about half their original thickness.



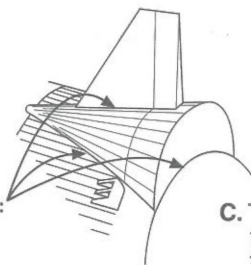
- D. When completely dry, use a hobby knife and fine grain sandpaper to remove the excess flash. Fill with putty as necessary.

11.

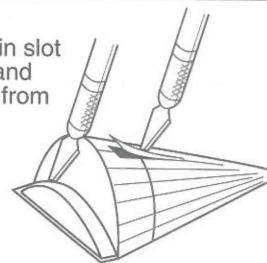


- A. Use a hobby knife to carefully remove the fairings from their vac-form sheet leaving 1/16" (2 mm) of flash.

NEED EXACT FIT:

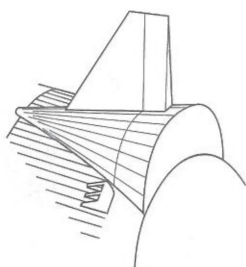


- B. Remove the fin slot indentations and bottom ledge from each fairing.

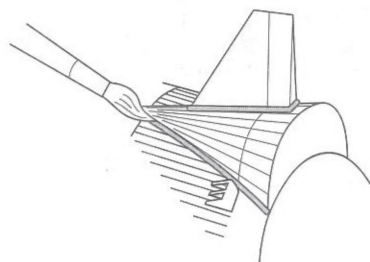


- C. Test fit, trim, and sand each fin to fit each fairing and each fairing to fit on the lower first stage wrap.

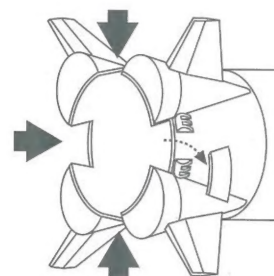
12.



- A. Slide one of the fins into the cut-out in one of the fairings, and position the fairing on the lower stage wrapper.



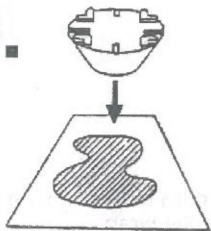
- B. Check that the fin projects straight out from the tube, and cement fin and fairing into place using liquid plastic cement or plastic CA. Repeat for other three fins.



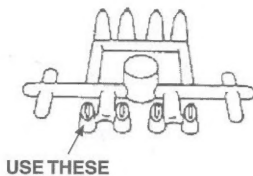
- C. When fins and fairings are dry, apply a reinforcing coating of liquid cement to the fin, fairing, and wrap joints. Let dry. Fill any holes with putty and sand flush.

- D. Once the fairings are permanently affixed, cut away the areas on the tube where shown.

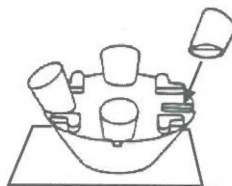
13.



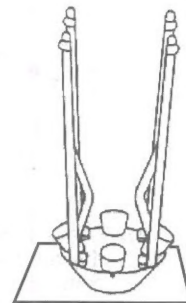
A. Lightly spray a piece of scrap card stock with spray adhesive and tack the top of the tower skirt to the card. Build the tower upside down using the skirt as a base.



USE THESE

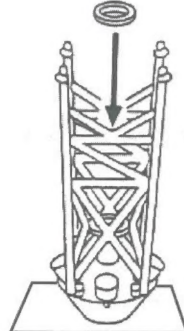
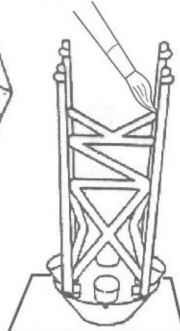
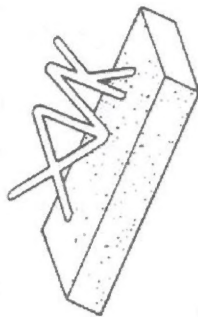


B. Slide the ribs on the nozzles into the slots on the skirt and glue into place using liquid plastic cement. (Be sure to note angle of nozzle.)



C. Tack the leg assemblies into the raised corners on the skirt so that the X braces angle in toward each other.

D. Lightly sand the partial leg pieces, test fit between the leg assemblies, then tack into place. Straighten the legs until the X braces all align and the legs project up and slightly out from the tower, then add liquid cement to all contact points.



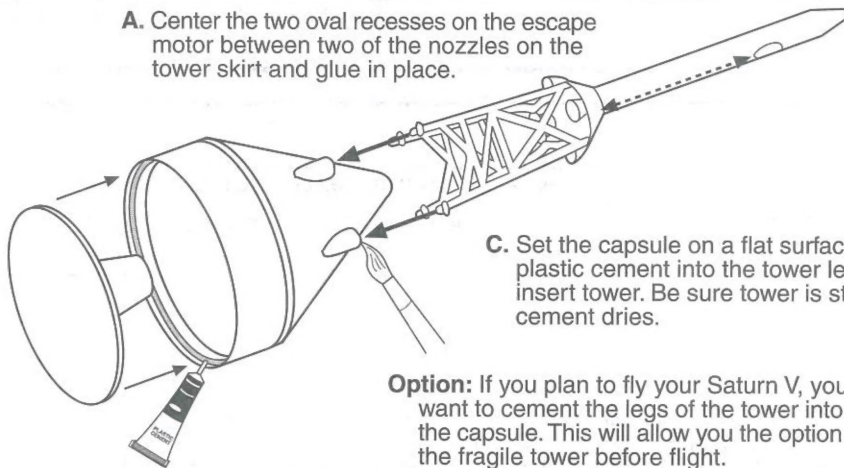
E. Use a set of tweezers to position the support ring at the center of the X braces, and cement in place.

F. Remove tower from card and scrape any glue residue from top of skirt.

14.

A. Center the two oval recesses on the escape motor between two of the nozzles on the tower skirt and glue in place.

B. Glue the capsule base into the bottom of the capsule.

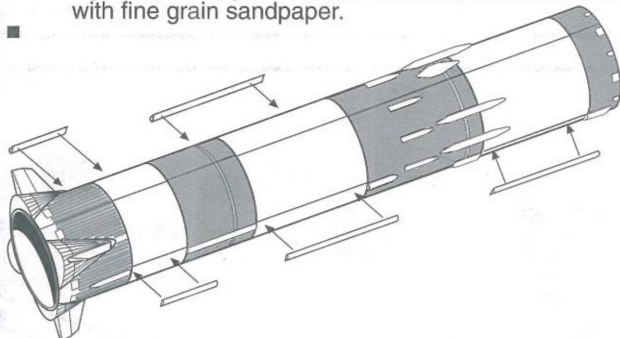


C. Set the capsule on a flat surface, drop liquid plastic cement into the tower leg holes, and insert tower. Be sure tower is straight before cement dries.

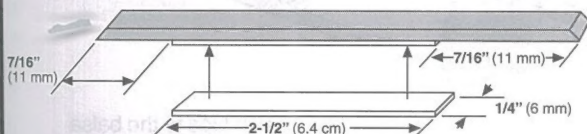
Option: If you plan to fly your Saturn V, you may not want to cement the legs of the tower into the holes in the capsule. This will allow you the option of removing the fragile tower before flight.

15.

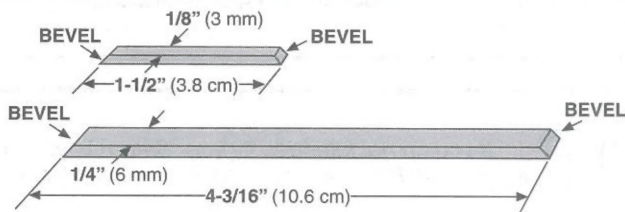
A. Lightly sand the pieces of half-round wood tunnel material with fine grain sandpaper.



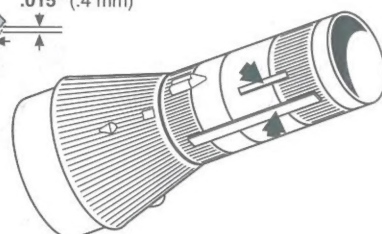
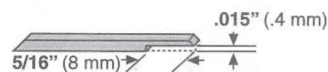
B. Mark and cut the wood to continue the "tunnels" between the 1st stage wrapper and inter tank wrapper (both sides), between the inter tank and inter stage (both sides), and between the inter stage and upper 2nd stage (one side), then use wood glue to apply to body tube. Note: You may want to fill and sand the rounded surfaces of the wood tunnels before applying them.



D. Cut a plastic shim 2-1/2" x 1/4" (6.4 cm x 6 mm) and apply to the bottom of the 4-3/16" (10.6 cm) long flat wood tunnel as

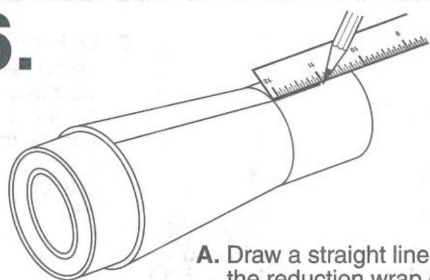


C. Use the diagram and cut pieces from the 1/16" (2 mm) x 1/4" (6 mm) wood strip. Bevel as shown.

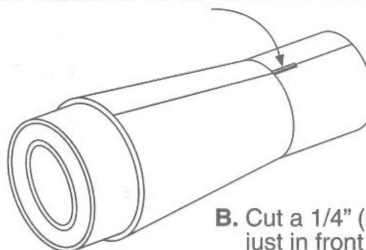


E. Sand the front of the 1-1/2" (3.8 cm) flat wood tunnel at the front to fit the wrap. Fill and sand the top surfaces of the flat wood tunnels if you wish and apply where shown. Be sure to align tunnels.

16.



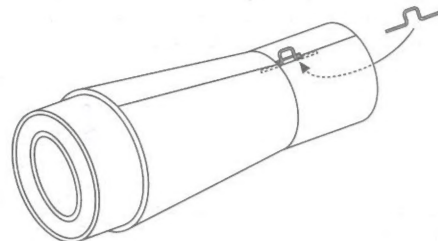
A. Draw a straight line from the front of the reduction wrap glue seam to the front of the L.E.M. body tube.



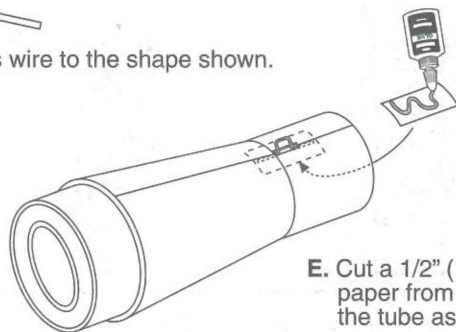
B. Cut a 1/4" (6 mm) long slit in the tube just in front of the wrap.



C. Bend the short piece of brass wire to the shape shown.



D. Press the "U" shaped hook out through the slit.



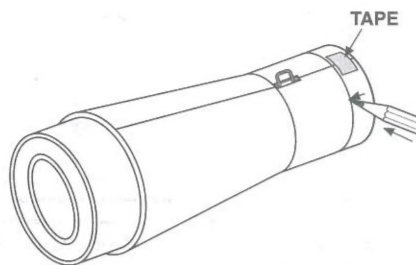
E. Cut a 1/2" (1.3 cm) by 1" (2.5 cm) piece of scrap paper from one of the cards, and apply inside the tube as a backing for the wire.

17.

A. Cut out the Reaction Control System (R.C.S.) nozzle marking guide at right.

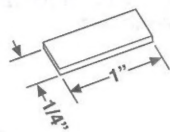


B. Wrap the guide around the top of the L.E.M. body tube, tape in place, and then use a scribe or sharp pencil to punch 1/16" (2 mm) holes into the tube at the four arrow points at the rear of the guide. The R.C.S. nozzles will attach at the hole locations later.

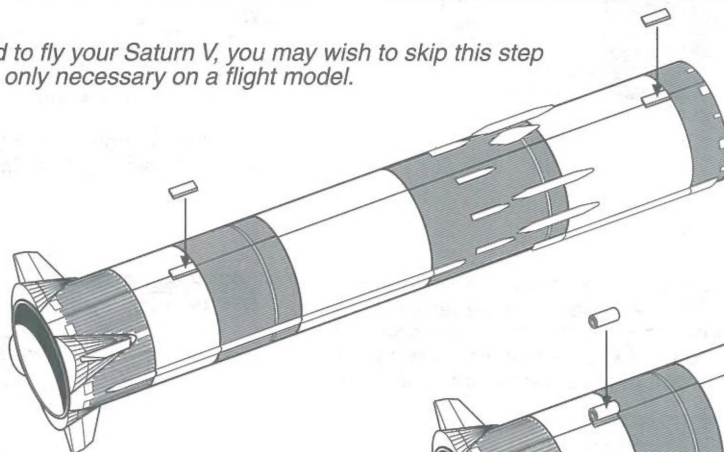


18.

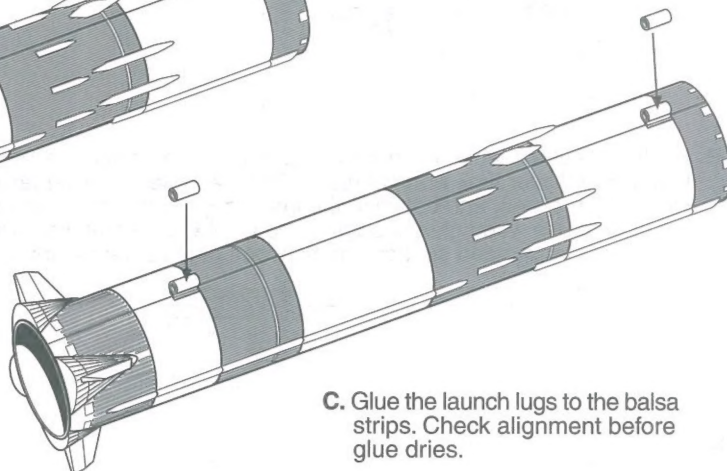
If you do not intend to fly your Saturn V, you may wish to skip this step as launch lugs are only necessary on a flight model.



A. Cut two 1" (2.5 cm) long strips from the 1/16" (2 mm) balsa.

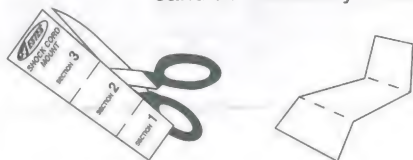


B. Glue the balsa strips over the alignment line on the main body tube just behind the inter tank wrap and just behind the upper second stage wrap. Let dry.



C. Glue the launch lugs to the balsa strips. Check alignment before glue dries.

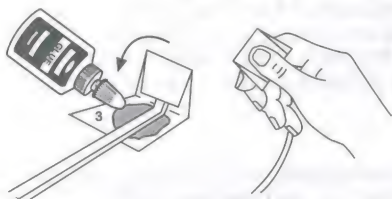
- 19.** A. Test fit the separate sections of the body together, and sand as necessary to achieve a good fit.



- B. Cut out the two shock cord mounts on card #83951. Fold as shown.



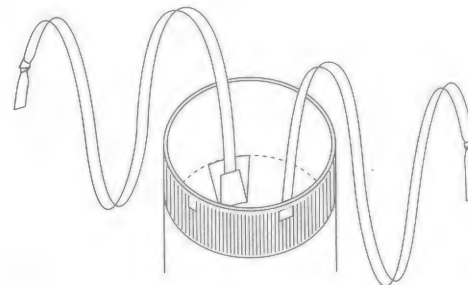
- C. Lay shock cord onto shock cord mount at an angle as shown and apply glue to section two. Fold section 1 over.



- D. Apply glue to section 3. Fold forward again. Clamp firmly until glue sets.

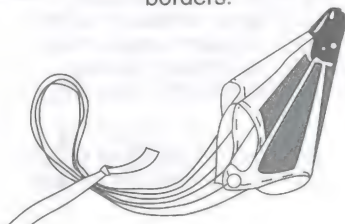
- E. Repeat for the other shock cord and mount.

- F. Apply glue to each mount and apply mounts to opposite sides of the main body tube at least 2" (5.1 cm) down.

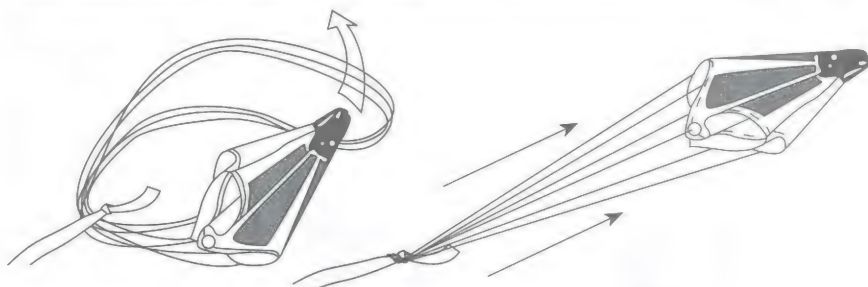


- G. Tie a double knot at the free end of each shock cord.

- 20.** A. Build all three parachutes according to the instructions printed on the 'chute borders.



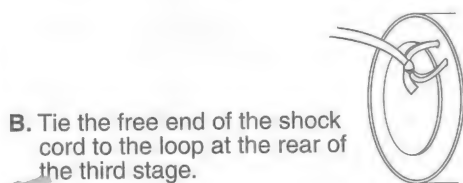
- B. Form a loop in the shroud lines of one of the 24" (61 cm) parachutes and lay a mounted shock cord over loop.



- C. Pass parachute through loop and pull tight. Repeat with the other 24" (61 cm) 'chute and mounted shock cord.

21.

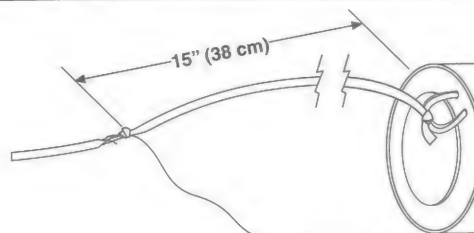
- A. Form a loop with the shroud lines on the 18" (46 cm) parachute, and tie the remaining shock cord to the loop with a double knot.



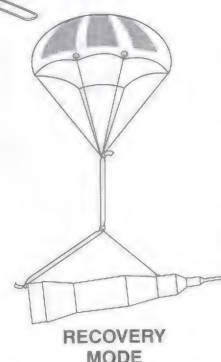
- B. Tie the free end of the shock cord to the loop at the rear of the third stage.

- D. Tie the other end of the line to the shock cord 15" (38 cm) from the rear of the third stage, then knot the shock cord over the line.

- C. Measure a 13" (33 cm) piece from the remaining shroud line material and tie one end to the snap swivel as shown.



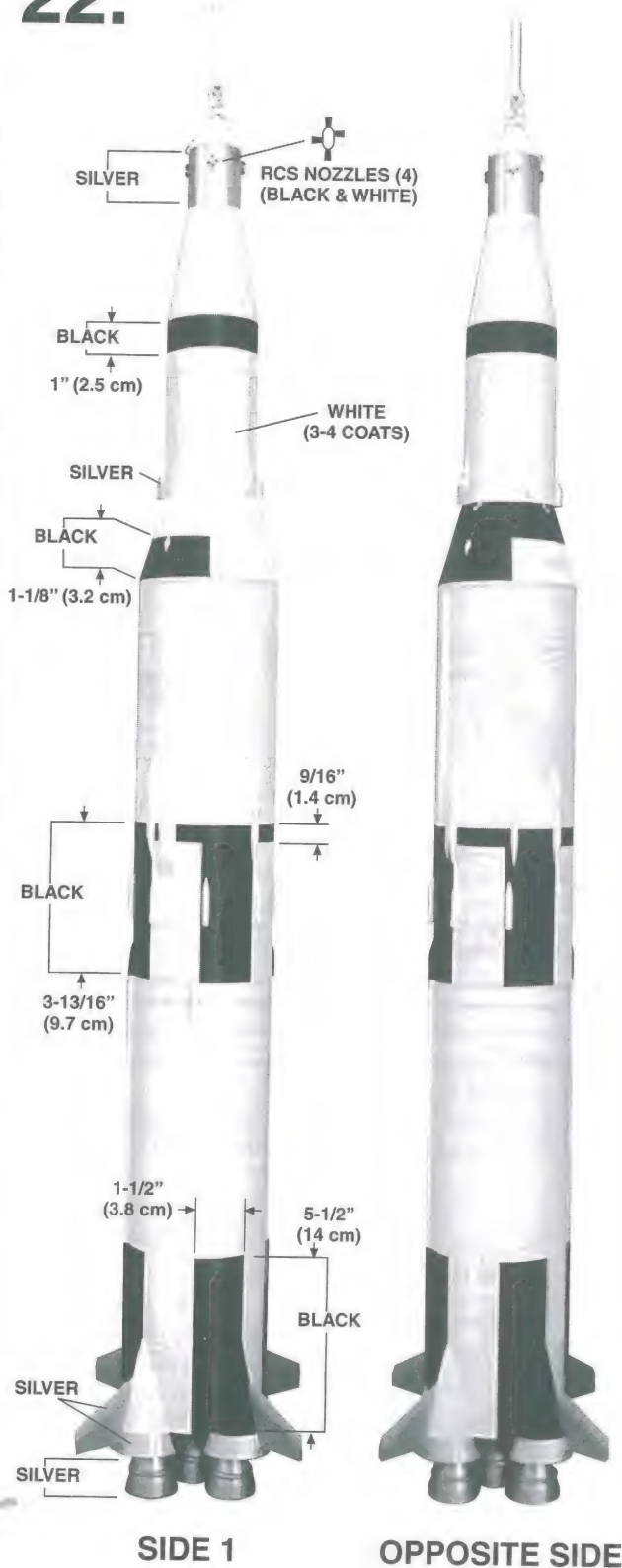
- E. Snap the front of the snap swivel onto the brass anchor at the top of the LM/SM (The snap swivel allows you to detach this portion of the recovery system and pack into the body tube for display.) Unhook for painting.



PAINTING

Before painting, check that all the grain on wooden parts is filled, that all parts are firmly attached, and that any small gaps have been filled using putty or glue. If you did not fill the spirals in the body tubes earlier, do so now. Spray adhesive can be removed with a tissue dipped in enamel thinner (use sparingly!), and wood glue or CA can be removed using a fine grain sandpaper. If you do not wish to mask off the model, you may spray the entire model white, then use bottle paint for the black and silver (or gunmetal) areas. Again, **DO NOT USE LACQUER BASED PAINTS**. They will attack the plastic parts of your Saturn V. If you have any doubt about the paints you wish to use, use a piece of scrap plastic as a test surface. Follow the instructions in step 24 to pack your parachutes before painting.

22.



A. Remove the display nozzle assembly and paint the visible (rear) section silver or gunmetal gray. Spray a coat of good quality sandable primer (suitable for plastics and paper) over the entire surface of the model. Let dry, then examine the model for flaws. Correct as necessary. Prime and sand the model until you are satisfied with the finish.

B. Spray the entire model with 3-4 coats of flat white and let dry at least 24 hours. While paint is drying, carefully study the diagram for the location of the black, gunmetal gray, and silver areas. Careful masking is required to obtain the correct paint pattern.

Masking Notes: Special automotive masking or pinstriping tape is preferred for use due to the low tack and flexibility of the material. If using ordinary masking tape, press it against a plate of glass to remove some of the adhesive before applying to the model. When masking surfaces that have a compound curve, use narrow tape or cut your tape into narrow strips so that it will stretch and follow the curve. Carefully mask all paint separation points, then cover the large exposed areas with paper or plastic (the less tape touching the model the better) making sure the edges are taped down to prevent overspray. In all cases, mask off the coupler shoulder to prevent paint from building up on the mating surfaces. Spray another coat of white to seal the masked area and minimize overspray and let dry. Once dry, spray the color onto the masked area. As soon as the paint is dry to the touch, carefully remove the masking.

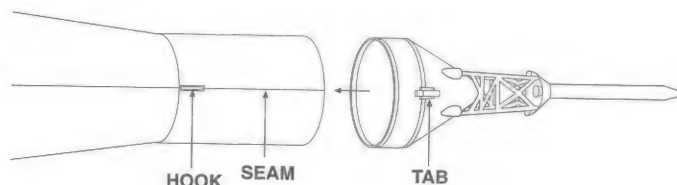
C. Mask off the fins and engine fairings and paint them silver or gunmetal gray (be consistent with the color you painted the display nozzle assembly.)

D. Cut out the masking guide for the Service Module (S.M.), and paint the exposed S.M. surfaces silver.

E. Paint the plastic RCS nozzles as shown.

F. Use the diagram to mask and paint the roll pattern.

G. Once the roll pattern is complete and dry, use CA to apply the RCS nozzles



H. Place the capsule on top of the L.M./S.M. assembly, rotate until plastic tab is aligned with seam and hook, make an alignment mark, and apply with CA.

I. Align seams and glue the LM/SM to the third stage.

23.

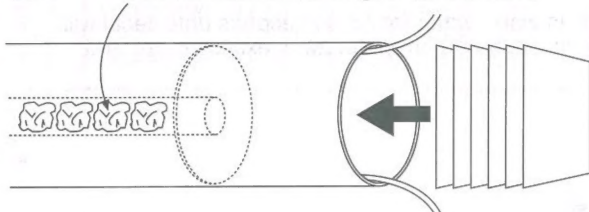
- [illegible]

- E.** Finish by painting the entire model with a flat clear coat.

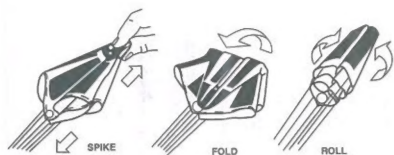
ROCKET PREPARATION

24.

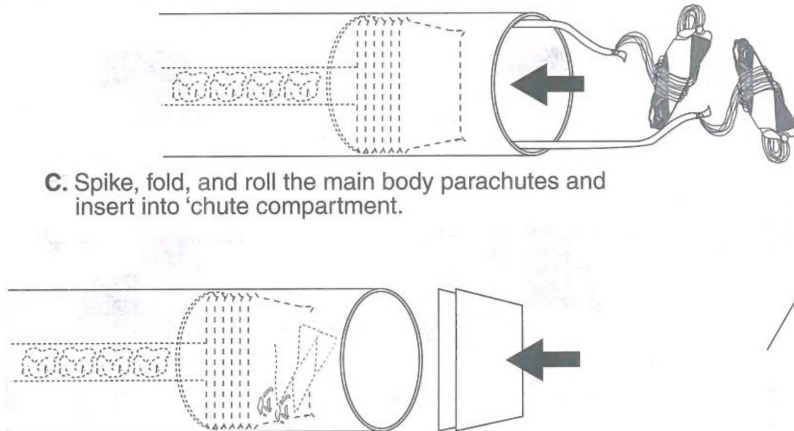
A. Crumple and stuff four squares of recovery wadding into the front of the engine mount tube.



B. Lay six squares of wadding flat in the bottom of the 'chute compartment.

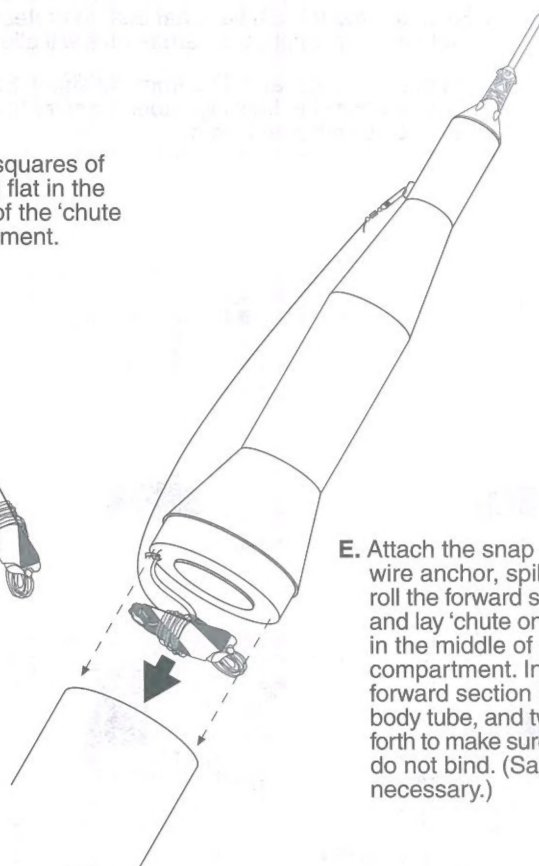


C. Spike, fold, and roll the main body parachutes and insert into 'chute compartment.



D. Lay two flat squares of wadding on top of 'chutes.

E. Attach the snap swivel to the wire anchor, spike, fold and roll the forward section 'chute, and lay 'chute on the wadding in the middle of the 'chute compartment. Insert the forward section into the main body tube, and twist back and forth to make sure the sections do not bind. (Sand if necessary.)



ENGINE PREPARATION

25.

A. Separate igniter and plug



B. Hold engine upside down and drop in igniter. Igniter must touch propellant.



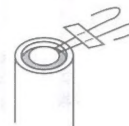
C. Insert igniter plug.



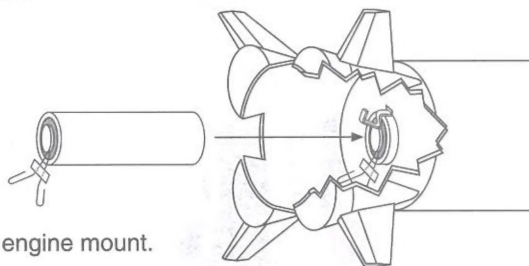
D. Firmly push all the way in.



F. Bend igniter wires back as shown.



E. Slide engine into engine mount.



LAUNCH SUPPLIES

To launch your Saturn V you will need the following:

- Launch Pad (North Coast Rocketry® by Estes® Modular™ Launch Pad (NCR 3552) with 5' x 1/4" (1.5 m x 6 mm) launch rod
 - Launch Controller (Estes® Electron Beam® [EST 302220] or North Coast Rocketry® by Estes® Command Controller™ [NCR 2234])
 - Estes® Recovery Wadding (EST302274)
 - Recommended Estes Engine: D12-3 ONLY!
 - Igniters and Igniter Plugs (Included with Estes engines.)
- Use only Estes products to launch this rocket.

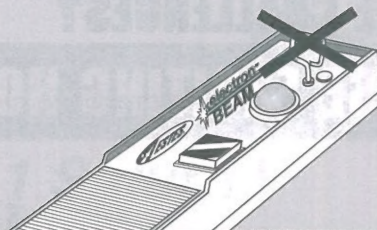
PROJECTED ALTITUDE

ENGINE	FEET	METERS
D12-3	175	53

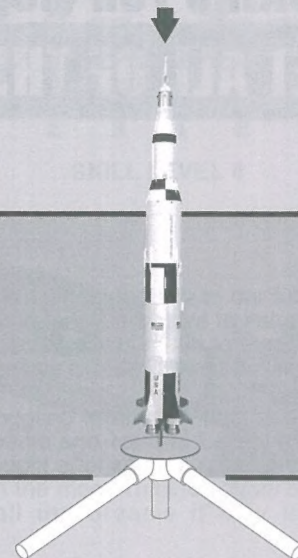
Note: Follow the information provided in these instructions - they supercede the information on the box wrapper.

COUNTDOWN AND LAUNCH

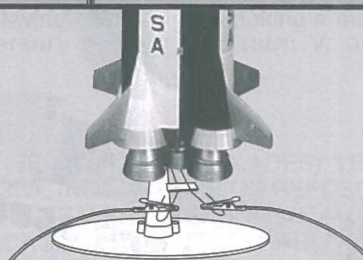
- 10...** Safety key must not be in launch controller.
The safety cap should be on the launch rod.



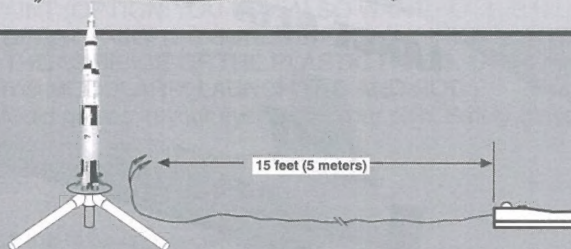
- 9...** Remove safety cap from launch rod, slide launch lugs over rod. Make sure rocket slides freely and micro-clips are clean for good electrical contact.



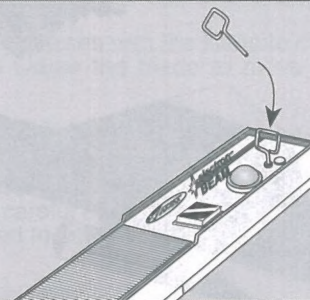
- 8...** Attach micro-clips to the igniter wires. Arrange the micro-clips so they do not touch each other or the metal blast deflector. Attach micro-clips as close to protective tape on igniter as possible.



- 7...** Move everyone back from your rocket as far as launch wire will permit at least 15 feet (5 meters).

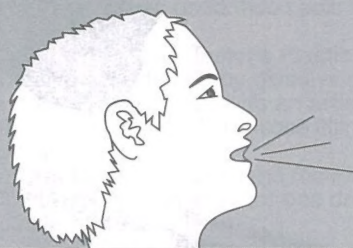


- 6...** Insert safety key to arm the launch controller.



- 5...** Start audible countdown.

4...3...2...1.....



LAUNCH!

Push and hold button until engine ignites.

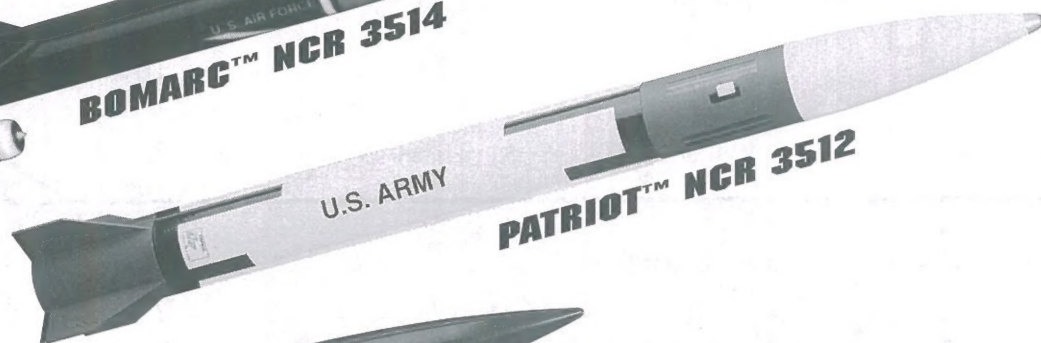
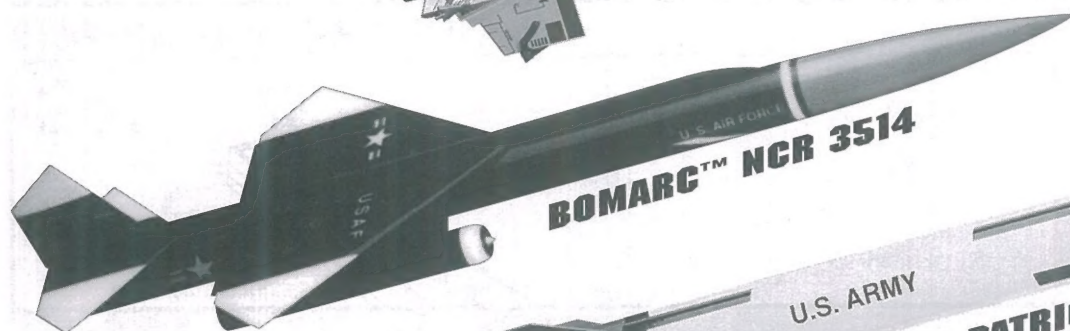
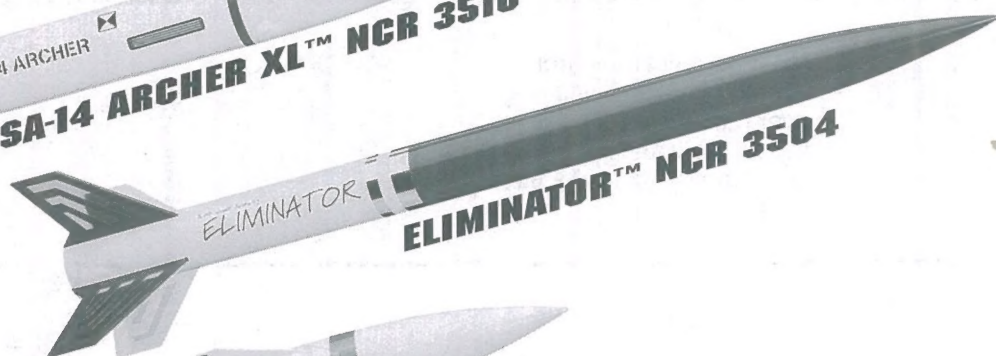
For safety, immediately remove safety key from launch controller. Replace safety cap on launch rod.

MISFIRES

When an ignition failure occurs, **remove the safety key** from the launch control system and **wait one minute before approaching the rocket**. Remove the expended igniter from the engine and install a new one. Be certain the coated tip is in direct contact with the engine propellant. Broken or chipped coating will not affect the performance of the igniter. Reinstall the igniter plug as illustrated previously. Repeat the countdown and launch procedure.

LOOKING FOR MORE CHALLENGES?

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